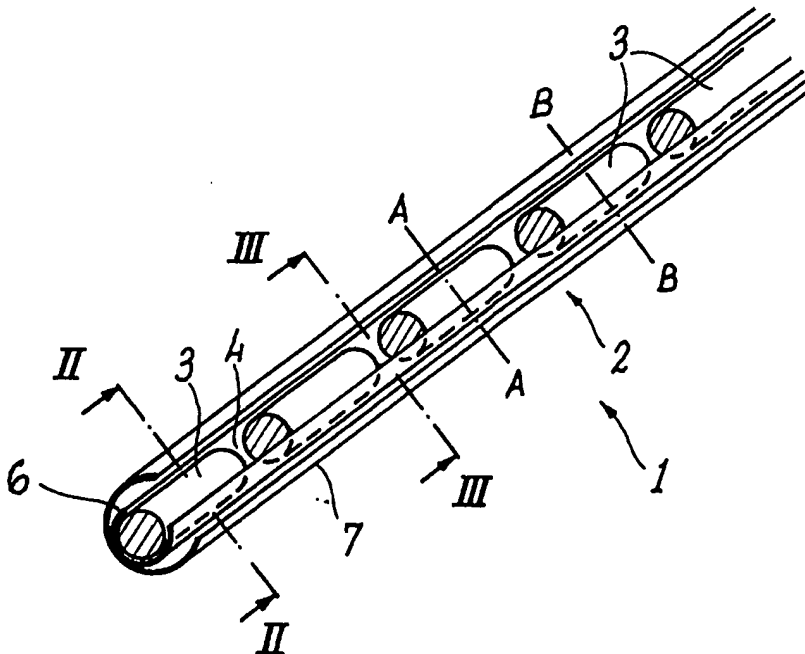




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(21) International Application Number: PCT/IT99/00288 (22) International Filing Date: 14 September 1999 (14.09.99) (30) Priority Data: RM98A000590 14 September 1998 (14.09.98) IT (71) Applicant (for all designated States except US): FILTRATI S.p.A. [IT/IT]; Via Leopoldo Serra, 32, I-00153 Roma (IT). (72) Inventor; and (75) Inventor/Applicant (for US only): GEROLA, Aldo [IT/IT]; Filtrati S.p.A., Via Leopoldo Serra, 32, I-00153 Roma (IT). (74) Agents: BANCHETTI, Marina et al.; Ing. Barzano' & Zanardo Roma S.p.A., Via Piemonte, 26, I-00187 Roma (IT).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i>
(54) Title: IMPROVED MULTIPLE CAVITY FILTER (57) Abstract The invention relates to an improved multiple cavity (4) filter (2) comprising at least a first filter length (3) and a second filter lengths (3), at least a cavity (4) between said first and second filter lengths (3), a first paper (6), partially externally enclosing said first and second filter lengths (3), as well as said cavity (4), leaving an upper filling opening, filling material (5) to be introduced within said cavity (4) through said opening created by said first paper (6), and a second paper (7), outer with respect to said first paper (6), completely wrapping said first inner paper (6) and said first and second filter lengths (3), and said cavity (4).		



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IMPROVED MULTIPLE CAVITY FILTER

The present invention relates to an improved multiple cavity filter.

5 More specifically, the invention concerns a cigarette filter of the above kind, realised in such a way to obtain an optimum filling of the cavity with the desired substance (activated carbons, etc.).

Before proceeding with the present description, it is wished to point out that for the purposes of the invention, the material by which the filter length, the outer paper are realised, as well as the number of cavities provided in a single filter, does not constitute a limitation of the inventive filter, since the solution according to the present invention provides a filter structure that will be described in the following and that allows to obviate to some drawbacks of some multiple cavity filters already available on the market.

15 Furthermore, in the specification and claims that will follow a reference to the single filter will be made, and as it will better specified said single filter is manufactured as a filter assembly or rod, but is used as single element in the final product (cigarette).

20 As it is well known, special filters exist for particular kind of cigarettes, which are known as "multiple cavity filters", wherein "multiple" means that they perform different filtering actions, while "cavity" means that they provide at least one cavity within which filtering material (e.g. activated carbons, etc.) or aromatising (e.g. menthol, etc.) is introduced.

25 Said filters are manufactured by standard manufacturing techniques, providing a series of filter lengths made up of cellulose acetate, or other suitable and required material for the specific use, spaced by gaps creating said cavities when the assembly is wrapped by the outer paper.

30 A single filter rod provides a plurality of filters that will be then separated to obtain the single filters.

At present, along the multiple cavity filter manufacturing line, single filter lengths are placed at a suitable distance on the paper, and the outer paper is partially wrapped until closing more the half of the filter length circumference.

35 Now, the filling of the cavity by the specific substance is carried out.

It is evident that the filling can be limited to the volume of the cavity wound by the outer paper, since in case this limit is passed, the risk exists that the material, usually granules, goes out of the cavity, placing between the outer paper and the filter length, so that the final filter rod, after the complete closure of the outer paper, cannot be used, since the filter will have spread granules out of the cavity.

The direct consequence of said limitation is that of being able to fill the cavity at a percentage of its whole volume corresponding to about 50%.

This aspect is a limitation to the functionality of the same filter.

Different solutions exist in order to solve the above problem, mainly aimed to modify the step of feeding the substance within the cavity.

Mainly, they are solution requiring important and consequently complicated and expensive modification to the manufacturing line.

Therefore, specific object of the present invention is that of providing a solution to the above mentioned drawback, allowing to reach very high filling rate of the cavity volume.

Furthermore, object of the invention is that of providing a solution extremely simple, cheap and that does not require substantial modifications to the manufacturing lines presently employed.

These and other results are obtained according to the present invention by the realisation of a filter providing a first inner paper, partially enclosing the filter lengths and defining an opening of the cavity that will allow the filling of the same cavity, and a second outer paper completely surrounding the filter lengths.

It is therefore specific object of the present invention an improved multiple cavity filter comprising at least a first filter length and a second filter length, at least a cavity between said first and second filter lengths, a first paper, partially externally enclosing said first and second filter lengths, as well as said cavity, leaving an upper filling opening, filling material to be introduced within said cavity through said opening created by said first paper, and a second paper, outer with respect to said first paper, completely wrapping said first inner paper and said first and second filter lengths, and said cavity.

Preferably, according to the invention, said at least first and second filter lengths are comprised of cellulose acetate and/or pure cellulose or other suitable materials.

Furthermore, according to the invention, said first and second wrapping papers can be comprised of the same material or of different materials.

5 Always according to the invention, said filter can provide a plurality of cavities between a plurality of filter lengths.

Still according to the invention, said opening created by the first paper partially wrapping the filter lengths can have variable dimensions in function of the specific need.

10 Said filling material can be variously granular, having a filtering and/or aromatizing activity and/or having a different activity.

The present invention will be now described, for illustrative but not limitative purposes, according to its preferred embodiments, with particular reference to the figures of the enclosed drawings, wherein:

15 figure 1 is a perspective view of a series of filtering lengths according to the invention, opened to show their inner features;

figure 2 is a cross section view along the line II-II of figure 1;

figure 3 is a cross section view along the line III-III of figure 1;

and

20 figure 4 is a longitudinal section view of the filter series of figure 1.

Referring now to all the figures of the enclosed drawings, and particularly, at the beginning, at figure 1, it is shown a rod 1 comprising six multiple cavity filters according to the invention, wherein between the lines A-A and B-B a single filter 2 is individuated as it will be obtained after the cut of the rod 1.

25 Rod 1 comprising the filters 2 provides a plurality of filter lengths 3, made up of cellulose acetate or of any other suitable material, spaced each other to obtain a cavity 4, for the following filling by the chosen material.

30 Around the spaced lengths 3 a first paper 6 is provided, enclosing the lengths 3 in such a way to leave an upper opening to feed the material 5 up to a height well above the half of the circumference of lengths 3 (see particularly figure 4).

35 A further outer containment paper 7 is provided externally with respect to the paper 6, said paper 7 being completely closed only after the filling of the cavities 4 by material 5.

Along the manufacturing line, it will be sufficient to provide the application of inner paper 6, within paper 7, on which the lengths 3 will be placed, and to completely close said paper 6 about the same lengths 3 in such a way to partially wrap their circumference.

5 The simple adding of the paper 6, that, when it is completely wrapped, must partially surround lengths 3, thus allow to obtain a very high filling of the cavity 4 without requiring substantial modifications and high costs for the manufacturing line.

10 As already said, the solution suggested according to the present invention is valid independently from the materials employed for lengths 3, papers 6 and 7, the filling material 5, as well as the number of cavities provided in a single filter 2 (in other words, notwithstanding the basic solution provides an assembly comprising length 3 – cavity 4 – length 3, it is also possible to realise filters having a structure of the kind
15 length 3 – cavity 4 - length 3 – cavity 4 - length 3, etc.)

Furthermore, it must be pointed out that the two papers 6 and 7 could be comprised of the same material or of different materials having different features in function of the specific needing.

20 The present invention has been described for illustrative but not limitative purposes, according to its preferred embodiments, but it is to be understood that modifications and/or changes can be introduced by those skilled in the art without departing from the relevant scope as defined in the enclosed claims.

CLAIMS

1. Multiple cavity filter characterised in that it comprises at least a first filter length and a second filter length, at least a cavity between said first and second filter lengths, a first paper, partially externally enclosing said first and second filter lengths, as well as said cavity, leaving an upper filling opening, filling material to be introduced within said cavity through said opening created by said first paper, and a second paper, outer with respect to said first paper, completely wrapping said first inner paper and said first and second filter lengths, and said cavity.
2. Multiple cavity filter according to claim 1, characterised in that said at least first and second filter lengths are comprised of cellulose acetate and/or pure cellulose or other suitable materials.
3. Multiple cavity filter according to claim 1 or 2, characterised in that said first and second wrapping papers are comprised of the same material or of different materials.
4. Multiple cavity filter according to claim 1 or 2, characterised in that said first and second wrapping papers are comprised of different materials.
5. Multiple cavity filter according to one of the preceding claims, characterised in that said filter provides a plurality of cavities between a plurality of filter lengths.
6. Multiple cavity filter according to one of the preceding claims, characterised in that said opening created by the first paper partially wrapping the filter lengths has variable dimensions in function of the specific needing.
7. Multiple cavity filter according to one of the preceding claims, characterised in that said filling material is variously granular, having a filtering and/or aromatizing activity and/or having a different activity.
8. Multiple cavity filter according to each one of the preceding claims, substantially as illustrated and described.

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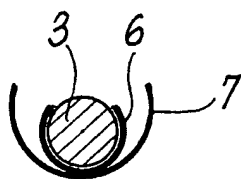
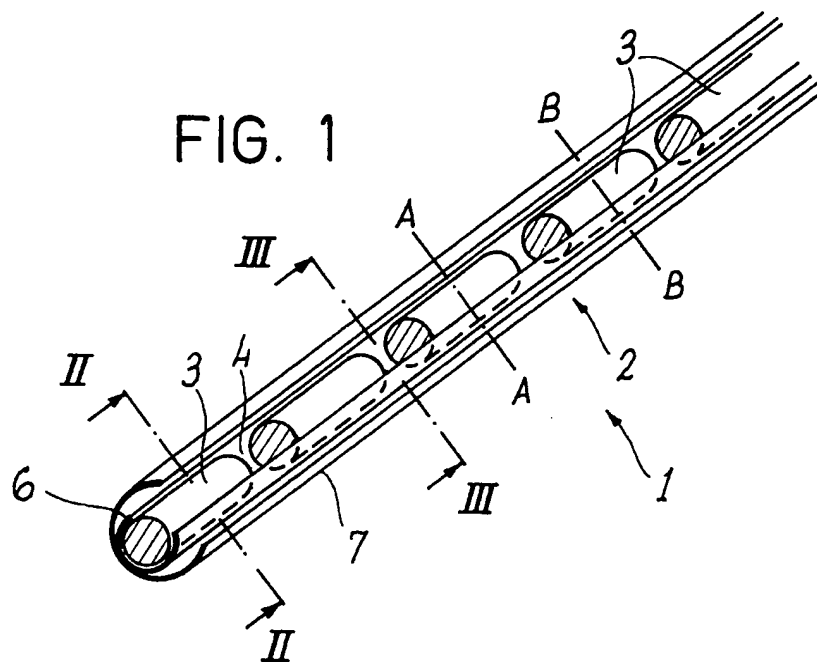


FIG. 2

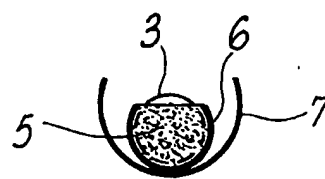


FIG. 3

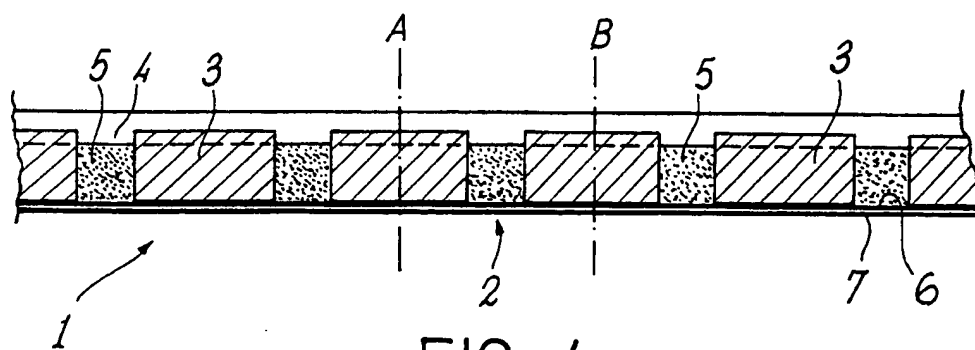


FIG. 4

INTERNATIONAL SEARCH REPORT

Int. lonal Application No

PCT/IT 99/00288

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A24D3/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A24D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 482 488 A (SEXSTONE) 9 December 1969 (1969-12-09) the whole document ---	1-8
A	US 3 807 286 A (SEXSTONE) 30 April 1974 (1974-04-30) the whole document ---	1-8
A	US 4 185 645 A (BOEGLI) 29 January 1980 (1980-01-29) the whole document -----	1-4,7

☐ Further documents are listed in the continuation of box C.

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3482488	A	09-12-1969	BE 726736 A	10-07-1969
			CH 502074 A	31-01-1971
			DE 1901120 A	31-07-1969
			FR 2000181 A	29-08-1969
			GB 1251241 A	27-10-1971
			NL 6900540 A, B,	15-07-1969
			SE 353836 B	19-02-1973

US 3807286	A	30-04-1974	BE 801635 A	15-10-1973
			CA 977234 A	04-11-1975
			CH 562573 A	13-06-1975
			DE 2316692 A	18-04-1974
			DK 145405 B	15-11-1982
			FI 57690 B	30-06-1980
			GB 1381071 A	22-01-1975
			NL 7313229 A, C	08-04-1974
			ZA 7300927 A	28-11-1973

US 4185645	A	29-01-1980	CH 608347 A	15-01-1979
			CH 604574 A	15-09-1978
			KR 8200958 A	31-05-1982
			AR 210922 A	30-09-1977
			AU 2030876 A	15-06-1978
			BR 7608238 A	29-11-1977
			CA 1040047 A	10-10-1978
			DE 2555129 A	23-06-1977
			DK 548876 A	09-06-1977
			ES 454066 A	16-03-1978
			ES 465678 A	01-01-1980
			FR 2334312 A	08-07-1977
			GB 1544116 A	11-04-1979
			GR 63355 A	20-10-1979
			IE 44672 B	24-02-1982
			IL 51051 A	30-12-1979
			IT 1075040 B	22-04-1985
			JP 1055041 C	23-07-1981
			JP 52070097 A	10-06-1977
			JP 55046155 B	21-11-1980
			LU 76342 A	09-06-1977
			NL 7613563 A, B,	10-06-1977
			OA 5504 A	30-04-1981
			PH 13414 A	28-03-1980
			SE 7613147 A	26-05-1977
			SE 433428 B	28-05-1984
			YU 297076 A	31-05-1982
			YU 315381 A	31-10-1985
			AT 342480 B	10-04-1978
			AT 934175 A	15-07-1977
			BE 849111 A	01-04-1977
			BG 27534 A	12-11-1979
			FI 763508 A	09-06-1982
			PT 65940 A, B	01-01-1977
			SE 7613757 A	09-06-1978